



FM Measurement Demodulator FS-K7

for Spectrum Analyzer FSP

FM Measurement Demodulator for Spectrum Analyzer FSP for determining analog modulation parameters.

Display

- ◆ Frequency modulation (FM) or carrier power as a function of time
- ◆ RF spectrum (FFT)
- ◆ Table with numeric values for peak and RMS deviation, modulation frequency (AF), carrier offset, carrier power

Features

- ◆ Digital measurement demodulator with wide bandwidth range from 12.5 kHz to 10 MHz
- ◆ Restoration of sampled signal with high measurement accuracy
- ◆ Ideal for production and development of *Bluetooth*™ modules
- ◆ Great memory depth for long measurement sequences (I/Q memory 2x 128 ksamples)

FSP as FM Measurement Demodulator

Characteristics

Option FS-K7 adds FM demodulation to the functions of Spectrum Analyzer FSP.

The universal characteristics of the digital measurement demodulator open up a wide range of applications, e.g. measurements of synthesizer settling or frequency deviation. This makes FSP with option FS-K7 ideal for measuring modulation characteristics such as those required in the development and production of *Bluetooth* modules.

The measurement results can be subsequently displayed as

- ◆ Frequency (FM) or carrier power versus time or as an
- ◆ RF spectrum (FFT)

The main modulation parameters such as frequency deviation (peak, RMS), modulation frequency or carrier power are also numerically indicated in a table.

The sampled signal is restored and the signal is displayed in its original form. The sampling rate is automatically matched to the demodulation bandwidth.

Sequences with a length of up to 8.3 s (demodulation bandwidth 12.5 kHz) or 65 ms (demodulation bandwidth 1.6 MHz) can be recorded in the large I/Q memory of the FSP. This allows long bit sequences, such as occur with *Bluetooth* signals, to be completely investigated. The demodulated data can also be read out via GPIB, RS-232-C or LAN and processed on an external PC.

The FM and RF level trigger function with a wide dynamic range provides special trigger capabilities. This also allows signals to be tested for which no external trigger signal is available.

Measurement examples

Bluetooth modulation characteristics

The frequency deviation of the signal is determined for a specified bit sequence (...1111 0000... or 10101010...) and displayed as a measured trace and in numerical form. (Fig. 1)

Transient response of synthesizer

With the FM measurement demodulator function, the transient response of a synthesizer can be measured in digital communication systems like GSM or *Bluetooth* transmitters. (Fig. 2)

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Certified Environmental System

ISO 14001
REG. NO 1954

Certified Quality System

ISO 9001
DQS REG. NO 1954



...making the right connections.

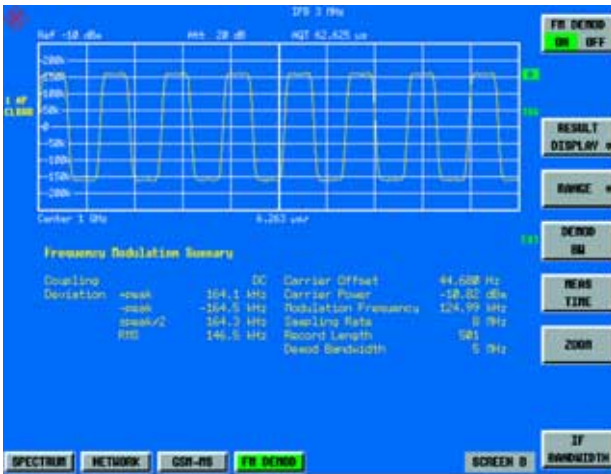


Fig. 1: Modulation characteristics of a Bluetooth signal

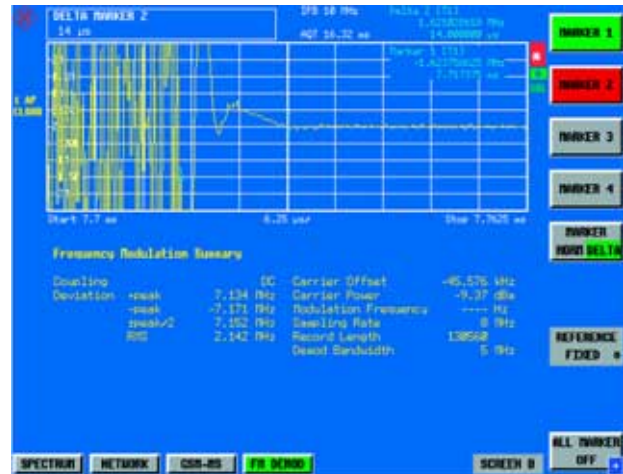


Fig. 2: Transient response of synthesizer

Specifications

Measurement of analog modulation signals

Demodulation bandwidth	12.5 kHz to 10 MHz
Max. record time	
Demod. bandw. ≤1.6 MHz	≥85 s/(demod. bandwidth/kHz)
Demod. bandw. > 1.6 MHz	≥34 s/(demod. bandwidth/kHz)
Readout	trace with frequency or RF power versus time, RF spectrum and table with numerical display of: peak and rms values of deviation, modulation frequency, carrier offset, carrier power (power of unmodulated carrier)

Frequency demodulation

AF	DC to 5 MHz (max. 0.5 x demod. bandwidth)
Deviation range	5 MHz (max. 0.5 x demod. bandwidth)
Deviation uncertainty	
AF + dev. ≤0.5 x demod. bandw. and AF ≤0.1 x IF bandwidth	<3% of result + residual FM

Residual FM ¹⁾

Demodulation bandwidth ≤200 kHz, rms	
RF ≤1 GHz	80 Hz, typ.
RF >1 GHz	80 Hz x √(f/1 GHz), typ.

¹⁾ RF input level ≥(reference level/dBm -10) dBm and
RF input level ≥(RF attenuation/dB -30) dBm.

Carrier power versus time

AF	DC to 5 MHz (max. 0.5 x demod. bandwidth) noise floor to +30dBm
Display range	
Max. dynamic range	
Demod. bandwidth 200 kHz	75 dB, typ.
Display nonlinearity	
S/N >16 dB	0.2 dB, typ.
Incidental AM with FM	
AF + dev. ≤0.5 x demod. bandw. and deviation ≤0.1 x IF bandwidth	0.1 dB + residual AM, typ.

Unmodulated carrier power

Measurement uncertainty	
S/N >16 dB, RF=50 kHz to 3 GHz	1 dB, typ.

AF

Range	≤5 MHz (max. 0.5 x demod. bandwidth)
Resolution	5 digits
Uncertainty	0,1 %

RF spectrum

Span	12.5 kHz to 10 MHz
Resolution bandwidth (FFT filters)	1 Hz to 10 MHz
Shape factor 60:3 dB	2.5 nominal

Order information

FM Measurement Demodulator for FSP FS-K7

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